
Chapter 2B-The Chemical Basis of Life

Bonding, Water & pH

Directions: Write your answer in the spaces provided using complete sentences.

1. Explain what holds together the atoms in a crystal of table salt (NaCl).

2. What enables neighboring water molecules to hydrogen-bond to one another?

3. When you look at the “beads” of sweat on your face following a hard workout, can you explain what holds those drops together?

4. Compared to a basic solution at pH 9, the same volume of an acidic solution at pH 4 has how many more times hydrogen ions (H^+)?

Directions: Mark each statement below with *T* if it is true and *F* if it is false.

_____ 5. Sodium chloride is an example of an ionic compound.

_____ 6. An ionic bond is the force holding molecules together.

_____ 7. Water consists of an atom of oxygen that has formed a covalent bond with two atoms of hydrogen.

_____ 8. If the atoms in a molecule share electrons equally, the molecule is said to be nonpolar.

Directions: Explain the difference between each of the following sets of terms in the space provided.

9. Ionic bond, covalent bond _____

Directions: Practice using the pH scale by giving the approximate pH of each of the following. Some are listed in the modules; others you can estimate from the information given.

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|---------------------------------------|--|
| _____ 10. Tomato juice | _____ 16. Concentrated nitric acid (very acidic) |
| _____ 11. Human blood | _____ 17. Acid precipitation |
| _____ 12. Vinegar (moderately acidic) | _____ 18. Drain cleaner (very basic) |
| _____ 13. Pure water | _____ 19. Antacid pills (mildly basic) |
| _____ 14. Cola (moderately acidic) | _____ 20. Urine |
| _____ 15. Household ammonia | _____ 21. Gastric acid |

Directions: Select the answer that best completes the question or statement below. Place your answer in the blank space.

- _____ 22. Why are biologists so interested in chemistry?
- a. Chemicals are the fundamental parts of all living things.
 - b. Most chemicals are harmful to living things.
 - c. They know little about life except the chemicals it is made from.
 - d. If you understand the chemistry of life, you can make a lot of money.
 - e. Everything about life can be known by understanding its chemistry.
- _____ 23. Which of the following holds atoms together in a molecule?
- a. ionic bonds between atoms
 - b. transfer of protons from one atom to another
 - c. sharing of electrons between atoms
 - d. loss of neutrons by atoms
 - e. sharing of protons between atoms
- _____ 24. Potassium chloride consists of potassium ion (K^+) and chloride ions (Cl^-) in a crystal. If potassium chloride is placed in water, what do you think happens.
- a. The K^+ ions are attracted to the oxygen atoms of water molecules.
 - b. It will not dissolve.
 - c. The Cl^- ions are attracted to the oxygen atoms of water molecules.
 - d. It acts as an acid.
 - e. The K^+ ions are attracted to the hydrogen atoms of water molecules.

_____ 25. Adding acid tends to _____ of a solution.

- a. increase the hydrogen ion concentration and raise the pH
- b. Increase the hydrogen ion concentration and lower the pH
- c. decrease the hydrogen ion concentration and raise the pH
- d. decrease the hydrogen ion concentration and lower the pH
- e. **c** or **d**, depending on the original acidity

_____ 26. You can use a product such as “Jet Dry” in your dishwasher to keep water from clinging to dishes and causing spots. Jet Dry must work by interfering with

- a. cohesion
- b. covalent bonding
- c. evaporation
- d. adhesion
- e. ionic bonding